

AMENDMENTS TO THE CLAIMS

Please amend the claims as noted below, without prejudice to subsequent renewal. The listing of claims below replaces all prior versions, and listings, of claims in the application.

These amendments introduce no new matter and support for the amendment is replete throughout the specification and claims as originally filed. These amendments are made without prejudice and are not to be construed as abandonment or dedication of the previously claimed subject matter, or agreement with any objection or rejection of record.

Listing of Claims:

1. (Currently amended) A translation system comprising:
an orthogonal lysyl tRNA (lysyl O-tRNA) or modified variant thereof;
an orthogonal aminoacyl tRNA synthetase (O-RS) that preferentially charges an orthogonal lysyl tRNA or modified variant thereof with homoglutamine; or
an orthogonal lysyl tRNA (lysyl O-tRNA) or modified variant thereof and an orthogonal aminoacyl tRNA synthetase (O-RS) that preferentially charges the lysyl O-tRNA or modified variant thereof with homoglutamine;
wherein the O-RS and lysyl O-tRNA or modified variant thereof are at least 50% as effective at suppressing a ~~stop or frame shift~~ selector codon as ~~Ph Δ AD or, an I41 and/or S268 mutant of Ph Δ AD~~ (SEQ ID NO:28; a mutant of *Pyrococcus horikoshii* tRNA synthetase), in combination with an O-tRNA of SEQ ID NO:26 and homoglutamine.
2. (Original) The translation system of claim 1, wherein the translation system comprises a cell.
3. (Original) The translation system of claim 2, wherein the cell is an *E. coli* cell.
- 4-5. (Cancelled)
6. (Currently amended) The translation system of claim 1, wherein the lysyl O-tRNA or modified variant thereof, the O-RS, or both, are derived from an archaeobacterium or from *Pyrococcus horikoshii* (PhKRS).

7. (Currently amended) The translation system of claim 6, wherein the O-RS is Ph Δ AD (SEQ ID NO:28), or an I41 and/or S268 mutant of Ph Δ AD (SEQ ID NO:28).

8. (Currently amended) The translation system of claim 6, wherein the O-RS, when expressed in an *E. coli* cell displays a toxicity that is the same as or less than an I41 and/or S268 mutant of Ph Δ AD (SEQ ID NO:28).

9. (Original) The translation system of claim 1, wherein the lysyl O-tRNA or modified variant thereof comprises a recognition sequence for a four base codon or an amber codon.

10. (Original) The translation system of claim 1, wherein the lysyl O-tRNA or modified variant thereof comprises a recognition sequence for AGGA.

11. (Original) The translation system of claim 1, wherein the lysyl O-tRNA or modified variant thereof comprises an anti-codon loop comprising a CU(X)_nXXXAA sequence.

12. (Original) The translation system of claim 11, wherein the CU(X)_nXXXAA sequence comprises CUCUAAA or CUUCCUAA.

13. (Previously presented) The translation system of claim 1, wherein the lysyl O-tRNA or modified variant thereof comprises SEQ ID NO:26.

14. (Cancelled)

15. (Original) The translation system of claim 1, comprising an additional O-RS and an additional O-tRNA, wherein the additional O-RS and the additional O-tRNA suppress a frame shift selector codon that is different from a frame shift selector codon suppressed by the lysyl O-tRNA or variant thereof and the O-RS that preferentially charges the lysyl O-tRNA or modified variant thereof.

16. (Original) The translation system of claim 1, wherein the translation system suppresses both a four base selector codon and a stop selector codon in a target nucleic acid that encodes a target polypeptide.

17. (Original) The translation system of claim **16**, wherein the four base selector codon comprises the sequence AGGA and the stop selector codon comprises the sequence TAG or UAG.

18. (Original) The translation system of claim **1**, comprising a target nucleic acid that comprises a four base selector codon.

19. (Original) The translation system of claim **18**, comprising a protein encoded by the target nucleic acid.

20. (Cancelled)

21. (Original) The translation system of claim **1**, comprising a target nucleic acid that comprises a four base selector codon and a stop selector codon.

22. (Original) The translation system of claim **21**, comprising a protein encoded by the target nucleic acid, wherein the protein comprises at least two different unnatural amino acids.

Claims 23 to 65. (Cancelled)